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The functions of music for affect regulation

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Abstract

Musical experiences are often reported to influence emotions (Juslin & Västfjäll, 2008; Sloboda, O'Neill, & Ivaldi, 2001): people consciously and unconsciously use music to change, create, maintain or enhance their emotions and moods (affect) on a daily basis for their personal benefit (DeNora, 1999; Schramm, 2005). This is known as affect regulation. However, existing research has not yet answered questions of how music regulates affect, especially beyond the expressive properties of music (Meyer, 1956). The aims of the studies presented here were to investigate (a) how music functions to regulate affect, (b) which affects it regulates, and (c) whether music listening can be considered a successful affect regulation device. A one-week diary study with interviews and a three-week diary study were conducted. The main findings were: (1) music helps through broader affect regulation strategies like distraction, introspection, and active coping; music can for example distract someone from the affect or situation, or help to think about the affect or situation in a rational way; (2) music plays a major role in creating happiness and relaxation; (3) music overall is a successful regulation device with a range of underlying mechanisms helping different strategies. The current paper is a valuable addition to the existing literature and provides several new insights into the function of music for affect regulation in everyday life. The insight gained into which strategies and underlying mechanisms are involved when music is used for affect regulation might be used for the benefit of people's emotional wellbeing.

Keywords

affect regulation, everyday life, music listening, strategies and mechanisms

Introduction

The ability to regulate emotions, moods and feelings (affect) in everyday life is generally considered vital for a healthy psychological life (Gross, 2007; Larsen, 2000). To regulate affect, people have several affect regulation methods at their disposal (e.g., Morris & Reilly, 1987; Parkinson

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& Totterdell, 1999; Wolfsdorf Kamholz et al., 2006). Music listening has been recognized as being a widely used device by people to consciously influence their affect (Batt-Rawden & DeNora, 2005; Behne, 1997; DeNora, 1999; Gabrielsson & Lindström, 1995; Sloboda, 1992). Thayer, Newman and McClain (1994) found that listening to music is the second most used device for changing a bad mood, raising energy and reducing tension. However, little is known about exactly how music listening functions in the process of affect regulation, and about the relative success levels of music listening in comparison with other regulation devices. Parkinson and Totterdell (1999) identified 162 different tactics, of which music listening is one (other examples are: taking a bath, deep breathing, exercising, writing a diary, telling yourself this bad situation will pass, and sleeping). Is this tactic of music listening just one of many possible tactics, or does it have a specific role in the process of affect regulation? This paper will address the function of music for affect regulation by arguing that the process of affect regulation should be studied at different levels of analysis. In the research described here affect regulation will be described at four different levels of analysis, with music listening being one of the levels. These levels are the affect regulation goal, strategy, tactic (music listening) and underlying mechanism. When a person wants to reduce work-related stress (goal) this person can for instance try to distract (strategy) him/herself from the stress by listening to music (tactic) which evokes pleasant memories (underlying mechanism). It is expected that the inclusion of these levels of analysis will provide the basis of a more precise and theoretically articulated account of the way in which music functions for affect regulation.

Affect regulating strategies with music

Despite a rise in music and emotion related studies over the last two decades, and the recognition of the regulatory function of music, there are only a few studies focusing specifically on music and affect regulation (Saarikallio & Erkkilä, 2007; Schramm, 2005). These studies indicate to some extent which strategies might be important for affect regulation with music (DeNora, 1999; Saarikallio & Erkkilä, 2007). For instance, Saarikallio and Erkkilä identified two main goals of using music (mood improvement or mood control) and seven of what they call regulation strategies; entertainment, revival, strong sensation, diversion, discharge, mental work, and solace.

Affect regulation strategies have been elaborately described in the general affect regulation literature (e.g., Carver et al., 1989). Although Saarikallio and Erkkilä identified different strategies and refer to the general affect regulation literature (Saarikallio, 2008; Saarikallio & Erkkilä, 2007), they do not make a direct comparison between their strategies and those strategies mentioned in these general affect regulation studies. This raises some questions. Are there any similarities or differences between Saarikallio and Erkkilä's strategies and the strategies that the affect regulation literature already knows about? If so, which strategies are not included in Saarikallio and Erkkilä's list, and if they are not included, is that because music does not function in this way, or because these strategies were not found by the researchers with the specific research methodologies employed? This paper will therefore use the strategies as defined in the general affect regulation literature as a starting point and from there will investigate which strategies are used in everyday-life affect regulation with music. Additionally, Saarikallio and Erkkilä do give strategies (intentions) for using music for affect regulation (e.g., for diversion of unwanted thoughts) but do not investigate how music makes it possible to achieve, for instance, diversion from unwanted thoughts. In other words, although part of the question of how music functions for affect regulation has been answered, the story is not complete.

Underlying mechanisms of music for affect regulation

The general music and emotion literature describes to a certain extent which factors lead people to experience emotions while listening to music (Juslin & Västfjäll, 2008). These factors might be related and important for the way in which people deliberately use music to regulate their affect. Instead of describing the general strategies through which music functions for affect regulation, this literature focuses on a more specific level of analysis; that of the underlying mechanisms of music. This level of underlying mechanisms has been described by Scherer and Zentner (2001) going considerably beyond more typical work (Hevner, 1937; Meyer, 1956; Sloboda, 1991) in not only focusing on the musical structure being responsible for emotional outcomes of music, but also discussing other factors like performance features, listener features and contextual features. This means that intrinsic (within the music) sources as well as extrinsic (iconic or associative) sources of emotion have been recognized (Sloboda & Juslin, 2001). Juslin and colleagues (Juslin & Laukka, 2004; Juslin, 2009; Juslin & Västfjäll, 2008) add to these factors a consideration of various mechanisms by which music could induce or evoke emotions. These underlying mechanisms might be expected to share features with the underlying mechanisms at work when music is used deliberately for affect regulation. Juslin and his colleagues discuss seven specific mechanisms, namely brainstem reflexes, evaluative conditioning, emotional contagion, visual imagery, episodic memory, music expectancy, and arousal potential. Although this provides a plausibly comprehensive overview of possible explanations of why music induces emotion, as Juslin and colleagues acknowledge, none of these mechanisms has been thoroughly explored yet through hypothesis-testing experimental investigation, and it has yet to be seen whether these emotion-evoking mechanisms are the same mechanisms that work for affect regulation purposes.

Affect regulation goals

It has been shown in the Experience Sampling Methodology (ESM) studies by Sloboda, O'Neill and Ivaldi (2001), and North, Hargreaves and Hargreaves (2004) that music is often listened to in everyday life, that most music is listened to at home and alone, and that people's own choice of music has a greater affective outcome on them than music they do not choose to listen to. Sloboda et al. (2001) have discovered some of the ways in which affect changes while listening to music (e.g., when people have more choice over the music, changes in affect become more marked), while North et al. (2004) have established some of the major reasons why people listen to music (e.g., to help pass time, for enjoyment, and to create the right atmosphere). Behne (1997) showed different listening styles amongst adolescents with "compensating listening" (when music regulates affect) as the most important type of listening. To explore further the contexts and motivations behind music listening, Juslin and Laukka (2004) conducted a questionnaire study asking for everyday life experiences with music. They found 10 basic motivations for listening to music which show that music often serves an emotion-related purpose (e.g., express emotions, relax, enjoyment, energize, evoke memories). It is noteworthy that the ESM studies include a description of the goal of listening to music, namely that of affect regulation. However, no attention is given to the question of how the music fulfils this goal and no detail is provided about which affects are in fact regulated. Juslin and Laukka (2004) do focus on underlying mechanisms (as described in the section on underlying mechanism), but did not gather their data in real world settings. None of the studies has explicitly asked about strategies. Taken together, these provide a partial answer to the question of which goals people

have when listening to music (to regulate affect amongst other things) and the outcomes of this music listening. However, the specific affects that are regulated still need further attention. There are, however, studies conducted which investigate the emotions evoked by, as opposed to regulated by, music. Zentner, Grandjean and Scherer (2008) have developed a nine-factor model of musical emotions including wonder, transcendence, tenderness, nostalgia, peacefulness, power, joyful activation, tension and sadness. Although these are musical emotions, and not everyday emotions regulated by music, there could be some overlap between the two.

Research questions

Bearing in mind the gaps in the research literature reviewed, the research questions addressed in this paper are: (1) which affects are regulated with music listening? (2) which affect regulation strategies are used in combination with the tactic of music listening? (3) which mechanisms underlie the process of affect regulation with music? and (4) how successful is music listening in comparison with other affect regulation tactics? In order to address these questions, two everyday-life diary studies were conducted, the first of which was followed by structured interviews.

Affect regulation in everyday life

Everyday life emotions are generally not very strong but mainly consist of "shifting mild emotion by small steps, rather than pushing people to strong extremes of elation, despair or fury" (Sloboda, 2010, p. 495). It can be argued that the emotion caused by a combination of music and other activities (such as exercising) is no longer a purely musical emotion. Most music, however, is listened to in everyday situations (e.g., while travelling). In the case of affect regulation, the role of music might typically lie in those types of experiences rather than in an emotional effect solely determined by the music itself. Everyday-life research in music focuses on the fact that most everyday-life music appears in situations where the music often plays a secondary role (Sloboda et al., 2001). The concurrent activity that accompanies the music (or vice versa), such as running or cleaning the house, might exert a strong influence on the emotion evoked (Sloboda, 2010). Whether this is true remains to be explored.

Due to the everyday-life nature of music, the real effect of music on people can only be investigated in everyday-life situations (Sloboda, 2008). It would never be possible to simulate a funeral in a laboratory situation, or to actually reproduce the feeling of being at home. Moreover, virtually no laboratory studies allow participants to listen to their own free choice of music, which means that participants are rarely actually listening to the music they would normally choose (Knobloch & Zillmann, 2002). Sloboda (2010) proposes that everyday-life research in music should consist of self-reports based on ESM or diary studies and interviews.

To study affect regulation with music in everyday life, an everyday-life research method needs to be adopted. One possibility is a diary study. There are three main types of diary study (Christensen, Feldman Barret, Bliss-Mroreau, Lebo, & Kaschub, 2003; Reis & Gable, 2000); the interval-contingent method, the signal-contingent method (like ESM), and the event-contingent method. The event-contingent method is capable of generating the types of reports that are required in the studies described here (Reis & Gable, 2000). In this method, participants report every time a predetermined event has taken place. This means that there can be a different number of responses for each participant at different times during the day. One disadvantage of this method is that participants need to report every time an event occurs and they might delay

the moment of report, which potentially increases retrospection bias (in the present study, this was taken into account in the instructions given to participants). An advantage of this method is that specific events can be investigated without missing out on certain events, which might happen through the interval-contingent method, or having many irrelevant reports placing an unnecessary burden on participants, as might be the case in the signal-contingent method. The use of the event-contingent method leads to a data set with a large amount of specific events which then can be compared.

Study 1

Method

Participants. A total of 44 participants (23 female, 21 male) took part in the study. Participants' ages ranged from 18 to 64 years with a mean of 28.7. Participants were undergraduate, postgraduate, and academic staff, with the majority being postgraduate students. Due to the method of recruitment (through emails to mailing lists and through a music course), participants were aware that the research was about music but unaware of the topic of affect regulation before participation. This resulted in participants that were mostly (but not all) active music listeners but were not necessarily aware of their affect regulation habits.

Materials. Study 1 followed an event-contingent method (Christensen et al., 2003). Since it was expected that participants might not be fully aware of their use of music for affect regulation, participants were asked to report every time they listened to music deliberately chosen by themselves, regardless of the regulation intention. This provided an easy-to-recognize event for the participants ("I listened to music"), a potentially large sample of events where music is deliberately used for affect regulation, and a useful comparison of the number of times music is listened to for affect regulation or for other purposes.

In everyday-life studies the time scale in which participants are asked to report about the activity, in this case their music listening, must be carefully selected (Christensen et al., 2003). On the one hand participants cannot be asked too much since everyday-life studies are relatively demanding, yet on the other hand enough data need to be collected, and a broad and representative range of everyday life situations needs to be included. Most typically, everyday-life studies take place over one, two, or maximally three weeks (Hektner, Smith, & Csikszentmihalyi, 2007). It was therefore decided to carry out a one-week (seven-day) diary study, including week days and weekends for all the participants.

The full questionnaire is given in Appendix A. Participants indicated how they felt before and after the music listening episode. They were asked whether they deliberately listened to music to influence the way they felt and if so, they were asked what their intention had been (e.g., to change sadness). After indicating that the participants intended to regulate their affect, participants were asked: What did you intend to do? They were asked to circle one of the words 'change', 'create', 'enhance', or 'maintain', and then nominate in an open-ended question the mood they wanted to change, create, enhance, or maintain (see Appendix A). In all cases where the participants intended to regulate affect, but also in those cases where the feeling before and after music differed (even when not intended), participants were asked to indicate how the music helped them by ticking all the appropriate affect regulation strategies (Question 13 in Appendix A). These strategies were selected on the basis of a comprehensive literature review and two survey studies (Van Goethem, 2010), and consisted of a combination

of behavioural and cognitive strategies recognized in the general affect regulation literature (e.g., Bushman et al., 2001; Carver et al., 1989; Fichman et al., 1999; Folkman & Lazarus, 1985; Gross et al., 2006; Heide & Borkovec, 1984; Salovey et al., 2002). Some examples are: Reappraisal: to try to think of the situation or mood in another way (she didn't mean it in such a horrible way); Rationalization: to try to think in a rational way about the situation or mood (this is not the end of the world); Distraction: to try to seek distraction from the situation or the mood; Venting: to let your feeling out; Active coping: to try to do something about the situation or mood (confront a person, or actually start studying for your exam); Introspection: to try to understand your own feelings; and Suppression: to try not to think about the mood or situation, or to actually feel the mood.

The structured interviews following the diary week were used to ask participants how the music had helped with the strategies, indicating what the underlying mechanisms of music for affect regulation might be. This inductive data-driven approach was taken because at the onset of the study (and still) very little was known about the underlying mechanisms used to regulate affect deliberately. Even the elaborate list of mechanisms identified by Juslin and colleagues (2004, 2008, 2009) has not yet been thoroughly explored by experimental investigation. This is contrary to the strategies used in this study which have been elaborated in the general affect regulation literature. Questions in these interviews could be as follows: "On Tuesday at 2 pm you were listening to Joy Division to change your 'stress about nothing' and you indicate that the music helped you to rationalize. Can you explain how the music helped you to rationalize?". Grounded theory was chosen as the method of analysis for the interviews, since this method is specifically designed for inductive theory construction (Glaser & Strauss, 1967). Due to the structured nature of the interviews the responses of "how music had helped certain strategies" were collected and coded for each strategy separately. This resulted in eight underlying mechanisms. These mechanisms could help different strategies. For an elaborate review of the working of the different mechanisms for each strategy see Van Goethem (2010).

Procedure. Participants were recruited for a study about the role of music in everyday life and had no prior knowledge of the emphasis on the use of music for affect regulation. Participants received a booklet with short questionnaires (one for each music listening episode). They met the researcher twice with the one-week diary in between. During the first meeting participants filled out one diary sheet in the presence of the researcher to ensure understanding of the questions and the different strategies. Examples were given of how the different strategies could apply to the use of music, since some strategies were expected to be more easily understood (e.g., distraction by music) than others (e.g., active coping by using music to help to deal with the situation that causes stress, i.e., finish the essay). Definitions of the strategies were also given in the diary booklet and discussed with the researcher for comprehensibility. Participants were asked not to report any episodes which were initially "forgotten" to decrease the possibility of retrospection bias. Participants were alerted to the temptation to avoid discussing certain episodes in the interview in order to lower the chance that they might leave out "painful" episodes in their diary. None of the participants used this option, and the content of the reported episodes included personal as well as everyday events. For the interview, 4 music listening episodes were selected from the diary, including as wide a range as possible of affects regulated and strategies used by the participant. The aim was therefore to cover as many different types of episodes within the participant as possible. To assure a wide spread of circumstances and uses of music participants had the opportunity to talk about additional (self-chosen) episodes as well.

Results

The 44 participants in diary study 1 nominated 500 music listening episodes in total. A total of 282 episodes were nominated to serve an affect regulation purpose (56.4%). Additionally, 107 episodes (49.08% of the remaining episodes and 21.4% of the total) which were not initially listened to for regulatory purposes were nominated to have influenced the affect of the listener. This means that music influenced affect in a total of 77.8% of the episodes.

Affect regulation goals. The wide range of types of affects mentioned to be regulated were categorized into 20 affects, including lonely, confident, hopeful, and proud (not nominated by participants in this study but relevant for study 2) and "other", which consisted of a variety of affects. As can be seen from Table 1 under "Study 1", regulating into a happy, calm, positive, tired/awake, or motivated affect or changing anger/frustration altogether accounted for over 75% of the episodes.

Affect regulation strategies. Participants could indicate which strategies had helped them to regulate affect with music by ticking all the appropriate strategies. This means that the total percentage of the strategies adds up to more than 100%, since participants often indicated that music had helped them with several strategies simultaneously or sequentially for

Table 1. The affects being regulated with music

Affect	Study 1			Study 2		
	N	%	Cum%	N	%	Cum%
Happy/excited	52	18.64	18.64	166 (1)	31.03	31.03
Calm/relaxed	33	11.83	30.47	70 (2)	13.08	44.11
Positive	31	11.11	41.58	19 (8)	3.55	81.87
Tired/awake	28	10.04	51.62	20 (7)	3.74	78.32
Motivated/working/attentive	28	10.04	61.66	46 (3)	8.60	52.71
Energetic	26	9.32	70.98	14 (11)	2.62	91.03
Angry/frustrated/annoyed	17	6.09	77.07	39 (5)	7.29	68.60
Stressed/tense	13	4.66	81.73	32 (6)	5.98	74.58
Sad/depressed	9	3.23	84.96	46 (4)	8.60	61.31
Thoughtful (also melancholic, nostalgic)	9	3.23	88.19	18 (9)	3.36	85.23
Fearful/anxious/worried	9	3.23	91.42	17 (10)	3.18	88.41
Bored	9	3.23	94.65	9 (12)	1.68	92.71
Negative	5	1.79	96.44	4 (14)	0.75	94.58
Romantic	1	0.36	96.80	6 (13)	1.12	93.83
Restless	1	0.36	97.16	1 (19)	0.19	96.64
Lonely	0	0	n.a.	3 (15)	0.56	95.14
Confident	0	0	n.a.	3 (16)	0.56	95.70
Hopeful	0	0	n.a.	2 (17)	0.37	96.07
Proud	0	0	n.a.	2 (18)	0.37	96.45
Other	8	2.87	100	18	3.36	100
Total	279	100		535	100	

Note. For study 2 the numbers between brackets indicate the order of "most often" to "least often" nominated affects. The cumulative percentage is given in this order.

Table 2. The affect regulation strategies used in combination with music

Strategies	Study 1		Study 2	
	N nominations	% of nominations	*N* nominations	% of nominations
Relaxation	178	62.9	153	30
Distraction	103	36.4	130	25.5
Active coping	70	24.7	128	25.1
Introspection	40	14.1	29	5.7
Venting	39	13.8	38	7.5
Rational thinking	39	13.8	32	6.3
Total	469	165.7	510	100

the same affect regulation goal and during the same music listening episode. During the interviews it became clear that some strategies were seen as similar by participants. For example, reappraisal and rationalization were often both selected and used interchangeably. This indicated that although there is a theoretical difference between these strategies, which was understood by the participants, everyday-life understanding and use merges the strategies into one more general strategy of "rational thinking". We therefore decided to see how the different strategies could be grouped together before analysing the data in more detail, resulting in a shorter list of strategies which can be used for further research as well. The rationale for grouping the strategies came from the interview data, and from a principal components analysis which was performed to see which of the original nominated strategies naturally occurred with others. Strategies that were part of the same component were grouped together (distraction and disengagement into distraction; reappraisal, positive thinking and rationalization into rational thinking; relaxation and tension reduction into relaxation; and active coping, venting and introspection remained as they were). Strategies that were not used often were left out of further consideration (suppression, denial, and social support), whereas the strategy of doing pleasant things was considered too general for the use of music listening (since music listening was generally nominated as a positive activity). The analysis was further conducted on the basis of the six remaining strategies of relaxation, distraction, active coping, introspection, venting, and rational thinking. Even after collapsing certain strategies together, many combinations of strategies in one music listening episode can be imagined and were actually present. On average 1.66 strategies were nominated for each episode. In Table 2 under "Study 1", the percentages of nomination of the six different strategies are given. As can be seen, music listening was mostly used for the strategy of relaxation.

Underlying mechanisms of the tactic of music listening. On the basis of the interviews, participants were asked to indicate how the music had helped them to engage in the different strategies. Using the methods of grounded theory, eight different underlying mechanisms were identified (see Table 3).

First, participants indicated that the features of the music itself helped them with affect regulation. Four mechanisms were derived from the characteristics of the music itself.

1. The emotion of the music can help. This category is compiled from participants indicating that the mood of the music was important, and more specifically that it was angry, funny/ cheerful/ upbeat, happy/ enjoyable/ amusing, melancholic or romantic music.

2. The type of music can help. This category was compiled from participants indicating that they admired the artist, they liked the variety of the music, the beauty of the music, or they nominated specific musical features.
3. The familiarity of the music can help. This means that participants indicated that the music was their favourite music, or it was familiar even to the extent where they referred to the music as being an "old friend".
4. The content of the music can help. Participants indicated that the lyrics or the topic of the song were important, for example, the artist's sorrow but also the humour of the music.

Table 3. The different categories of underlying mechanisms nominated by the participants to be the reason why music helped them with certain affect regulation strategies

	Different underlying mechanisms
Musical features	1. Emotion of music
	2. Type of music
	3. Familiarity of music
	4. Content of music
Outside present world	5. Other world
	6. Memories
Direct influence on mood	7. Creates happy mood
	8. Enhances level of mood
Combined activity	9. Music-related activities
	10. Music-unrelated activities
Through other strategies	11. Other strategies

Second, participants indicated that listening to music gave them the feeling they had "left the present world". Two mechanisms were established in which the participant mentally leaves the present world.

1. The music can create a feeling of being in another world. Participants indicated that they drowned out the presence of other people, drowned out silence surrounding them, found themselves in another world, or reported feeling that they were in some sort of vacuum. This phenomenon was also described by Gabrielsson (2010) in his strong experiences with music project, under the category of cognition and the changed experience of situation, body and mind, time and space, part and whole.
2. Music can help create memories. Participants indicated that they had memories which were either associated with the music or not, memories of worse events attached to the music to gain strength for the current situation, and that the music created a feeling of nostalgia.

Lastly, participants indicated that it was not the music alone but a combination of an activity and the music that helped them. Again, two mechanisms of activities with music were generated.

1. Music-related activities: participants were dancing, walking to the beat, singing along, intensively listening, focusing on the music, they went to concerts, and they actively chose their songs.

2. Music-unrelated activities: music was played alongside many different activities, e.g., housework, but also while exercising and walking, or smiling, and it helped other tactics, e.g., reading a newspaper.

Besides these mechanisms, participants also indicated that music could help through affect regulation goals or other strategies. They indicated that through enhancement of emotions or a small improvement of the affect (goal), these could be understood better and participants defined this as a necessary step before the actual regulation could start. They also mentioned several other strategies which worked in combination or sequentially and were therefore necessary for the actual regulation to take part. For example, a person experiencing anger can listen to music in order to calm down (relaxation), and this relaxation together with the music can make it possible to think rationally about the situation. Without the strategy of relaxation, the person might not be able to think things over. Although these are necessary steps in the process of regulation, they are not clear mechanisms and it was therefore decided not to include them in further analysis of this paper.

Discussion

The results from Study 1 give some insight into the role of music for affect regulation, showing that a wide variety of affects are regulated by 6 different strategies through different underlying mechanisms. However, there are some questions that remain. First, participants could indicate several strategies for each music listening episode, and participants used this option often. Although the strategy of relaxation appears to be used often, it might be that this strategy (when used in combination with another strategy) was not the most important for the established affect regulation. It is therefore useful to investigate which strategies are considered most important for affect regulation with music, by allowing participants only to nominate one strategy, despite the fact that several strategies can work simultaneously. Second, it has been established that music listening is often done for the purpose of affect regulation. However, it is unknown to what extent music listening is different or unique in comparison with other possible affect regulation tactics. It has been shown by Parkinson and Totterdell (1999) that many different affect regulation tactics exist, and in order to justify a focus on the tactic of music listening, it is important to investigate whether music listening has a unique applicability. Is it, for instance, possible to replace music with exercising, or do these two tactics serve different affect regulation goals and strategies? And is music listening as successful as suggested by the high amount of use of music for affect regulation purposes? It is therefore important to compare the affect regulation goal of music listening with other potential tactics, and also the success level of music listening when used for affect regulation purposes. Third, the underlying mechanisms derived from the interviews indicate how music helps to regulate affect, but the relative importance of the different mechanisms remains unknown. Which mechanisms are more often responsible for the affect regulation outcome, and do these mechanisms differ when different strategies are adopted? In the studies described here, the function of music listening for affect regulation was investigated at the level of goal, strategy, tactic and mechanism. In Study 2, the mechanisms found through qualitative research in Study 1 were investigated quantitatively.

Study 2

The second study investigated which strategies were most important during affect regulation episodes. Music listening as a tactic was compared with other tactics in terms of overall success

level and success level for each strategy, and the underlying mechanisms were further investigated in terms of amount of use overall and for each strategy.

Method

Participants. A total of 60 participants, 46 female and 14 male, took part in the study. Participants' ages ranged from 18 to 64 years with a mean of 21.7 years. The majority of participants were undergraduate students (N = 51), with 6 postgraduate students and 3 academic staff members. Due to the type of recruitment (through first-year undergraduate psychology research participation scheme and postgraduate mailing list) participants were aware of the affect regulation but not the music nature of the study. This resulted in both habitual and non-habitual music listeners taking part. Participants also varied in their affect regulation skills and insight.

Materials. In contrast to Study 1, participants were recruited for a study about affect regulation in everyday life and had no prior knowledge of the emphasis on music listening as an affect regulation tactic. Participants therefore were asked to report each time they were engaging in affect regulation activities and to report about all these activities. Participants indicated which strategy they used and which tactic had helped this affect regulation strategy. Unlike Study 1, participants were only allowed to nominate one strategy; this gives a better view of which strategy played the most central role in the affect regulation attempt. Participants also indicated how successful they judged the affect regulation attempt to have been. The success level was measured on a 0–10 scale (not successful at all – very successful). The study included three diary weeks in which some participants were asked in the second week to also include information about the underlying mechanisms of music listening on those occasions they used music for affect regulation purposes (at this point the emphasis of music listening was revealed to this group of participants). For an example of the diary questionnaires see Appendix B.

Procedure. The diary study was originally designed as an intervention study in which participants were requested to listen to more music in week 2. For space considerations, the intervention aspect of the diary will not be discussed (see Van Goethem, 2010). However, this design did result in a large number of participants filling out diaries for a total of three weeks. In the second week, some participants (n = 36) were requested to indicate through a tick-box question which of the 10 underlying mechanisms of music was most applicable for their affect regulation attempt in those cases where they did use music. Participants were instructed at all times to report about all attempts to regulate affect, not only on those involving music. Participants met with the researcher on a weekly basis. During the first meeting participants were thoroughly informed about the meaning and possible applications of the strategies.

Results

Participants reported 1613 affect regulation episodes, of which 535 (33.17%) involved music as an affect regulation tactic. Due to the design of the study, music was listened to more in the second week of the diary. However, the first diary week indicated that music was used 16.5% of the time, and it is therefore safe to say that after the tactic of talking to friends (used 26.7% in week 1, and 21.6% overall), music is the second most used affect regulation tactic in everyday life (watching TV or film and exercising were the third and fourth most used tactics; used respectively 7.7 and 6.5% of the time).

Affect regulation goals. The affects regulated by music are given in Table 1. Although the ranking of nominations is broadly similar to the order in Study 1, there are some differences. First, there were many more mentions for the regulation of a happy/excited affect, with 18.64% in Study 1 and 31.03% in Study 2. The high scoring positive affect (11.11%) and tired/awake affect (10.04%) of Study 1 were much less nominated in Study 2 (tired/awake 3.74 and positive 3.55%). On the other hand, the relatively low scoring sad/depressed affect regulated by music in Study 1 (3.23%) was reported to be regulated more often in Study 2, being (together with motivated affect) the third most regulated affect through the tactic of music listening (8.60%). Overall, however, both studies show that music listening is used most often for creating a calm/relaxed and happy/excited affect, and it can therefore be said that both studies show roughly the same affect regulation goals achieved through the tactic of music listening.

Affect regulation strategies. The strategies used here to regulate affect while adopting the tactic of music listening are similar to Study 1 when considering the three most and three least used strategies (see Table 2 above). Due to the possibility of only selecting one strategy at a time, the highly used strategy of relaxation in Study 1 (62.9%) becomes somewhat less important here (30% in Study 2) but is still, as in Study 1, the most used strategy in combination with music. The outcomes of both diary studies show that the strategies of relaxation, distraction, and active coping are quite similar in frequency and are used much more than the strategies of introspection, venting, and rational thinking (which are also quite similar in frequency).

Success level of music listening as a tactic. One new aspect of Study 2 was the participants' indication of the success level of their affect regulation attempts. The mean success level was relatively high ($M = 7.23$, $SD = 1.95$), with a range from 5.75 (Talking to oneself $N = 4$) to 8.71 (Hobby $N = 7$). Music had a mean success level of 7.27 and the most frequently used tactic of talking to friends/family had a mean success level of 7.28.

The success levels of the different strategies helped by the tactic of music listening versus non-musical tactics were compared by conducting two one-way ANOVAs, taking the success levels of either music listening or the other tactics as the dependent variable and the strategy as the factor. For non-musical tactics a significant difference in success levels was found ($F(5,995) = 7.78$, $p < .0001$). Post hoc tests showed that the strategy of active coping was significantly more successful than any other strategy except venting. The strategy of relaxation differed significantly from the strategies of distraction, introspection, and with a trend from rational thinking. This means that with non-musical tactics the strategies of active coping and venting were most successful (difference between active coping and relaxation $p = .031$, and distraction $p < .0001$, and rational thinking $p = .0004$, and introspection $p < .0001$), followed by the strategy of relaxation (difference between relaxation and distraction $p = .033$, and rational thinking $p = .056$, and introspection $p = .007$), and the least successful strategies were distraction, rational thinking, and introspection (see Table 4). The differences in success levels with the tactic of music listening were not significant ($F(5,500) = 1.90$, $p = .093$), which means that all strategies were equally successful. Although no significant differences were found, only the strategies of active coping and venting had higher scores for non-musical tactics than for the tactic of music listening; the other strategies scored higher when the tactic of music listening was used.

Underlying mechanisms of the tactic of music listening. In the second diary week some of the participants were asked to indicate which underlying mechanisms helped to regulate their affect with music. In Table 5, the number of nominations of each mechanism is given. In total,

Table 4. The mean success levels of the different strategies for music listening versus all other tactics and significance values

Strategy	Music listening		Non-musical tactics		*p*-value with active coping	*p*-value with venting	*p*-value with relaxation	*p*-value with distraction	*p*-value with rational thinking
	Mean	*SD*	Mean	*SD*					
Active coping	7.63	2.06	**7.66**	1.80	X				
Venting	6.92	1.99	**7.30**	1.76	ns	X			
Relaxation	7.31	1.75	7.26	1.90	.031	ns	X		
Distraction	6.99	1.87	6.87	2.05	<.0001	.045	.033	X	
Rational thinking	6.89	2.04	6.79	2.05	.0002	.061	.056	ns	X
Introspection	7.17	1.96	6.57	2.09	<.0001	.009	.007	ns	ns
Total	7.26	1.92	7.20	1.96					

Table 5. The amount of nominations for each underlying mechanism of music listening

Underlying mechanism	No. nominations	% nominations
Type of music	39	18.22
Familiarity	35	16.36
Unrelated activity	33	15.42
Emotion of music	30	14.02
Memories	25	11.68
Content of music	21	9.81
Related activities	20	9.35
Other world	11	5.14
Total	214	100

Note. The expected count was 26.8.

214 episodes using the tactic of music listening were reported in this week. A Chi-square test was conducted in order to investigate whether there was a difference between the number of nominations of the different mechanisms, indicating whether some mechanisms are more important than others. This was found to be significant: χ^2 (7, 214) = 22.33, p = .002. The type of music, familiarity, unrelated activities, and emotion of the music were all nominated above the expected count (26.8), and the remaining mechanisms under the expected count.

A Chi-square test was conducted for each strategy compared with the mechanisms as well. The three strategies that were used least often (venting, introspection, and rational thinking) all had expected frequencies of less than 5 for each mechanism, and it was therefore not possible to conduct a reliable statistical test based on those strategies. However, for ease of reference, the mechanisms that had higher observed frequencies than the expected count for these strategies have been printed in bold in Table 6.

The strategies of distraction, relaxation, and active coping were used enough for a reliable Chi-square test. The strategy of distraction did not show a significant difference for the mechanisms, and it can therefore be concluded that the entire range of mechanisms can be used for this strategy χ^2 (7,55) = 11.18, p = .130. All frequencies are given in Table 6, yet again, the mechanisms with a higher observed than expected counts are printed in bold.

Table 6. The nominated underlying mechanisms for each strategy

	Distraction		**Relaxation**		**Active coping**		**Venting**		**Introspection**		**Rational thinking**	
	Expected count		Expected count		Expected count		Expected count		Expected count		Expected count	
	6.9		7.5		7.5		3		1.6		2.2	
	Observed N	Resid.	Observed N	Resid.	Observed N	Resid.	Observed N	Resid.	Observed N	Resid.	Observed N	Resid.
Emotion	5	−1.9	**16**	8.5	4	−3.5	1	−2	**2**	0.4	1	−1.2
Type	6	−0.9	**14**	6.5	**9**	1.5	**7**	4	1	−0.6	2	−0.2
Familiarity	**14**	7.1	**13**	5.5	6	−1.5	1	−2	1	−0.6		
Content	6	−0.9	4	−3.5	2	−5.5	**5**	2	**2**	0.4	2	−0.2
Other world	4	−2.9	5	−2.5	2	−5.5						
Memories	4	−2.9	5	−2.5	**10**	2.5	1	−2	**2**	0.4	**3**	0.8
Related activities	**7**	0.1	1	−6.5	**8**	0.5	**3**	0			1	−1.2
Unrelated activities	**9**	2.1	2	−5.5	**19**	11.5					2	−0.2
Total	55		60		60		18		8		11	

Note. Resid. = Residual. Items printed in bold have a higher observed count than expected count. Only the strategies of distraction, relaxation and active coping have expected counts > 5.

The strategies of relaxation and active coping did show a significant difference for the underlying mechanisms (relaxation: χ^2 (7, 60) = 32.27, $p < .0001$, and active coping: χ^2 (7, 60) = 28.80, $p < .0001$). The mechanisms with a higher observed frequency than the expected count are printed in bold. It can be seen from Table 6 that the emotion, type and familiarity of the music are the most important underlying mechanisms for the strategy of relaxation and that memories, related and unrelated activities and the type of music are most important for the strategy of active coping. Different strategies are therefore helped through different underlying mechanisms of music listening.

Discussion

The diary studies presented in this paper aimed to discover what the function of music listening for affect regulation in everyday life is. A new approach was taken in which music listening was investigated at four levels of analysis: the goal, strategy, tactic, and underlying mechanism. This has resulted in findings which provide detailed information about the use of music as a mood regulation device. The first research question aimed to investigate which affect regulation goals are helped by music. The diary studies revealed that a large range of affect was regulated from becoming tired to becoming energetic, becoming happy, motivated, and calm. Although most regulation aimed to become more positive and to change negative effects such as stress and sadness, some people aimed to become nostalgic and melancholic with music as well. Participants mostly aimed to become happy/excited and calm/relaxed. This large variety of affects has some similarities with the GEMS emotions defined by Zentner et al. (2008). Joyful activation (happy/excited), sadness (sad/depressed), tension (stressed/tense), power (energetic), peacefulness (calm/relaxed) and nostalgia (thoughtful/melancholic/nostalgic) were all affects being regulated in the current studies. The musical emotions found by Zentner et al. reflect the emotions induced by music, whereas the affects in the studies described in this paper are everyday-life affects being influenced by music. Consequently, there are also some differences between these lists. Where Zentner et al. find musical emotions such as wonder, transcendence and tenderness, the current studies found everyday life affects such as motivation, frustration, worry and boredom to be regulated with music (van Goethem, 2010).

Besides the large similarities between the outcomes of the two studies, it has been shown that the nominations for various affect regulation goals differed somewhat between Study 1 and Study 2, with Study 2 having larger numbers of happy/excited and sad/depressed and lower numbers of positive and tired/awake than Study 1. This difference might be due to the type of question, where in Study 1 participants reported about every music listening episode, and in Study 2 participants reported about every affect regulation episode. This difference in approach might make it easier or harder to recognize certain events. By including both types of approach in this paper, this possible difference has been addressed and should be taken into account for further research.

The second research question aimed to identify which affect regulation strategies are helped through the tactic of music listening. The results confirm the use of six general strategies in everyday life, each with specific outcomes and applications. This list of strategies includes every different type of strategy as specified in the general affect regulation literature. These different types include strategies focusing on changing the situation (active coping) versus changing the affect (relaxation) (e.g., Gross, 1999; Larsen, 2000; Morris & Reilly, 1987), engaging (rational thinking) versus avoiding (distraction) strategies (e.g., Wolfsdorf Kamholz et al., 2006), and behavioural (venting) versus cognitive (introspection) strategies (e.g., Parkinson & Totterdell,

1999). This means that the list of strategies generated here covers the entire spectrum of strategies and can therefore be used in a wide variety of future studies.

It was shown that overall the strategies of distraction, relaxation, and active coping were mostly used, and this was also the case for music listening. It was shown that even when participants were asked only to nominate one strategy (in Study 2), the strategy of relaxation was used most in both studies. The second and third most used strategies of distraction and active coping, however, are used almost as often as the strategy of relaxation in Study 2. These three strategies can therefore be considered highly important for the use of music listening.

These strategies show some alignment with the strategies identified by Saarikallio and Erkkilä (2007), and also some differences. The strategy of relaxation can be compared with Saarikallio's and Erkkilä's strategy of revival, distraction can be compared with their diversion, venting with discharge, and introspection with mental work. Saarikallio and Erkkilä's strong sensation and solace seem more like potential underlying mechanisms than general affect regulation strategies. The strategy of active coping, which has been extensively described in the general affect regulation literature, does not appear in Saarikallio and Erkkilä's list. A possible explanation might lie in the underlying mechanisms used for active coping. The underlying mechanism of related and unrelated activities were nominated most for this strategy and participants in Saarikallio and Erkillä's study might not have mentioned these music listening episodes where other activities were present as well. It has been shown, however, that most music listening occurs while other tasks are being carried out and seldom happens as a sole activity (e.g., North et al., 2004; Sloboda et al., 2001). In order to obtain an overview of the full range of strategies being used in combination with the tactic of music listening, the strategy of active coping should be included.

The third research question aimed to identify possible underlying mechanisms of music listening when used for affect regulation. Study 1 has revealed a range of underlying mechanisms, some of which can also be found in Juslin and Västfjäll's (2008) list. Juslin and Västfjäll mention brainstem reflexes, associations (evaluative conditioning), emotional contagion, visual imagery, episodic memory and musical expectancy, while Juslin and Laukka (2004) also mentioned arousal feedback. Emotional contagion can be compared with the emotion of the music, and episodic memory was also found here as memory. Familiarity can be recognized as arousal feedback, and the type of music as musical expectancy, as identified by Juslin and Västfjäll. There was no evidence for brainstem reflexes found, and associations and visual imagery were reported only sporadically in the interviews in Study 1. However, the creation of another world (Gabrielsson, 2010) and the music-related and unrelated activities which were found in the current study are not present in the lists of mechanisms presented by Juslin and colleagues (e.g., Juslin & Västfjäll, 2008). It must be borne in mind that Juslin et al.'s theory is based on emotions evoked by music, whereas the studies presented here focus on already existing affects being regulated by music. It is therefore expected that there will be some differences between the type of underlying mechanisms, and also in their importance for either process.

Study 2 has shown that the different mechanisms found are not all equally important, and that their existence depends on the strategy with which music listening is combined. The intrinsic mechanisms of emotion, type and familiarity of the music were most important for the strategy of relaxation, whereas extrinsic mechanisms such as memories and related and unrelated activities were most important for the strategy of active coping. Unfortunately the strategies that were used less often in general and for music listening specifically (venting, introspection, and rational thinking) did not have enough nominations to enable identification of which

underlying mechanisms are most important for these strategies. Further research should therefore aim to investigate further which mechanisms are most important for which strategies.

The underlying mechanisms of other tactics could be investigated and compared with the underlying mechanisms of music. It is still unknown which underlying mechanisms play a role for other tactics, whether there are any similarities in existing underlying mechanisms, and how they might be used. Knowing more about other possible affect regulation tactics and their underlying mechanisms might further establish the specific role of music listening for affect regulation. The studies described here do show the importance of the investigation of affect regulation at the four levels of analysis elaborated here. This new approach has made it possible to identify combinations of strategies and mechanisms which would otherwise be overlooked.

The fourth and last question addressed in this paper was how successful music listening is in comparison with other affect regulation tactics. This question was raised to establish the quality of music listening for affect regulation. Study 2, however, showed that overall affect regulation attempts were successful, and that music listening was as successful as any other tactic. When looking at the success levels for each strategy combined with music listening or other tactics, however, it was shown that music listening is successful for all strategies on a similar level, while tactics overall reveal different success levels for different strategies. For instance, although not to a significant degree, the strategy of introspection (a typical solitary strategy) seemed to be more successful in combination with music listening. However, the strategy of venting (often done by sharing thoughts and feelings with friends) seemed less successful. In further research these possible differences should be further investigated.

The important role of music listening for affect regulation should not only be found in the success level of the tactic for a wide range of strategies, but also in the amount of use. As pointed out above, music listening was the second most used tactic in Study 2 after the tactic of talking to friends. With the vast number of possible tactics that can be used (Parkinson and Totterdell, 1999, identified 162 different ones), music listening being used as an affect regulation tactic in 16.5% of all affect regulation attempts can be considered impressive. Recall that participants did not know about the focus on music at this point in the study. The difference from the tactic of talking to friends can be explained by the fact that talking to friends is a social tactic, while listening to music is a solitary tactic.

The different samples of participants in the studies described in this thesis all derived from the population of a university in the Midlands, UK. However, the sampling often went beyond first-year psychology students. As well as university students, Study 1 included members of teaching and support staff. Although the emphasis lay on participants in their 20s, older people were included in the sample as well. Due to the mostly exploratory character of the studies it was not considered a priority at this stage to include people with different socio-economic statuses, levels of education or culture in the sample. However, in further research the music listening habits and affect regulation habits of a more varied sample should be considered. The sample in the current studies included mostly western, highly educated participants in their 20s. Music listening habits can very well differ at different age levels (see Saarikallio & Erkkilä, 2007), and in particular older people have not yet been considered widely. Cultural differences as well as socio-economic differences should also be considered. In particular, the type of music listened to, but also the amount of music listened to, and the use of music (in combination with particular strategies) could reveal interesting differences. Besides these differences, however, any possible similarities might emphasize the fundamental functions of music for affect regulation.

Study 1 recruited participants through an advertisement in which the musical nature of the study was emphasized. This resulted mostly, but not in all cases, in participants with a preexisting interest in music. To compensate for this potential bias, Study 2 did not reveal the music-nature of the study and recruited participants on the basis of the affect-regulation nature of the study. This resulted in a varied sample of habitual and non-habitual music listeners. When considering the amount of preexisting interest in music, a more elaborate approach could be taken in further research. Participants in the current studies all listened to music to some extent even though they were not selected as such, but it would be interesting to know how people regulate their affect if they hardly use music at all. Might it be possible and beneficial for these people to turn to music for affect regulation purposes, or would it be better for them to turn to or emphasize other types of affect regulation?

The studies described here have shown that the study of music listening as an affect regulation tactic should be carried out at four levels of analysis, focusing on the goal, strategy, tactic, and mechanism. The results have shown that music listening is a frequently used affect regulation tactic with a high success level and large range of goals and strategies. The focus on the four levels of analysis has provided detailed information about the use of music listening for affect regulation which can be used in further studies. Future research should focus more on the role of music for the lesser used strategies such as introspection, and further investigate the underlying mechanisms which seem to depend highly on the type of affect regulation attempt. With the knowledge gained from these studies an indication is given about how music functions for affect regulation in everyday life. This knowledge can be used in relation to learning affect regulation skills for people who need to or want to improve their skills for a healthier social and psychological life.

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Appendices

Appendix 1: Example of the diary questionnaire of Study 1

Please remember your most recent music listening episode in which you deliberately listened to music of your choice.

1. When did you listen to the music? _____
2. Where were you?: _____
3. Who were you with?: _____
4. Title track /album: _____
5. How you felt before: _____6. How you felt after: _____

(Try to be precise)

9. Did you mean to regulate the way you felt? (Circle yes or no as appropriate)

NO	YES
10. Why did you listen to the music?	11. What did you intend to do? To (circle appropriate): change / create / maintain / enhance _____(mood) 12. What situation caused you to want to do this?

13. If you did regulate the way you felt, can you describe how the music helped you? (Tick the appropriate box(es) and add other ways if necessary)

☐	Reappraisal	☐	Tension reduction	☐	Denial
☐	Rationalization	☐	Active coping	☐	Social support
☐	Disengagement	☐	Do pleasant things	☐	
☐	Relaxation	☐	Introspection	☐	
☐	Distraction	☐	Positive/negative thinking	☐	
☐	Venting	☐	Suppression	☐	
☐	I don't know how, but it did help				

Appendix 2: Example of the diary questionnaire of Study 2.

Exemplary Diary questionnaire

1. Was the regulation of your mood deliberately done or "accidentally" achieved (please tick the appropriate option)?
   My mood regulation was: ☐ deliberate ☒ accidental

2. I (circle the appropriate) (**Changed**) / **Changed into** / **Created** / **Enhanced** / **Maintained** my ___**stressed** _____mood (please state)

3. The main strategy contributing to this was (please tick only one):
   - ☒ Distracting myself from the mood or situation
   - ☐ Trying to relax
   - ☐ Actively doing something about the source of my mood
   - ☐ Venting
   - ☐ Trying to understand my mood (introspection)
   - ☐ Trying to think about the situation or mood in a rational way
   - ☐ Other (please state) _____

4. The tactic that helped me most to regulate my mood was (tick only one):
   - ☐ Exercising
   - ☐ Listening to music
   - ☐ Reading a book or magazine
   - ☐ Watching TV or a movie
   - ☐ Talking with friends
   - ☒ Other (please state) _***Tidying my room*** _____

5. My attempt to regulate was:

   Not successful at all — Very successful

   0 1 2 3 4 5 6 7 (8) 9 10

6. Any other comments:

   __*I didn't give it much thought but tidying my room helped me to forget about the work I needed to do, and after tidying things up I felt more like working. I also had some music on, which might also have helped me, but I could only pick one, and cleaning my room seemed most important.* ___
   _____